

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for

KANEKTOK RIVER CREEL CENSUS

by

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## RESEARCH PROJECT SEGMENT

State: Alaska

Name: Sport Fish  
Investigations  
of Alaska

Project: F-10-1

Study: S-62

Study Title: ANADROMOUS SALMON  
STUDIES

Job: S-62-1

Job Title: Kanektok River  
Creel Census

Cooperator: Kenneth T. Alt

Period Covered: 1 July 1985 to 30 June 1986

## ABSTRACT

From 14 June to 15 July 1985, a stratified, random creel census on the Kanektok River resulted in an estimated 5,212 angler hours expended to catch 3,132 chinook salmon, *Oncorhynchus tshawytscha* (Walbaum) and 2,121 chum salmon, *Oncorhynchus keta* (Walbaum). Only 667 chinook and 323 chum salmon were retained by anglers. Catch per hour ranged from 0.6 chinook salmon to 0.056 Dolly Varden char, *Salvelinus malma* (Walbaum). Most anglers were guided and were nonresidents.

## KEY WORDS

Kanektok River, freshwater creel census, chinook salmon, chum salmon, rainbow trout, Dolly Varden char.

## BACKGROUND

The Kanektok River is located south of Bethel in the Togiak National Wildlife Refuge; its popularity as a chinook salmon, *Oncorhynchus tshawytscha*, sport fishing stream has been increasing for the past 5 years (Figure 1). Estimated harvests increased from less than 500 fish in the early 1980s to a high of 1,511 fish in 1983 (Mills 1984). Mills (1985) and Alt (1985) estimated the 1984 chinook salmon harvest at 922 and 1,000 fish, respectively. The popularity of the river is due to airport access to the river at Quinhagak, wide publicity given the river because of its National Wildlife Refuge status, designation for inclusion in the Wild and Scenic Rivers system, and excellent runs of salmon and other species.

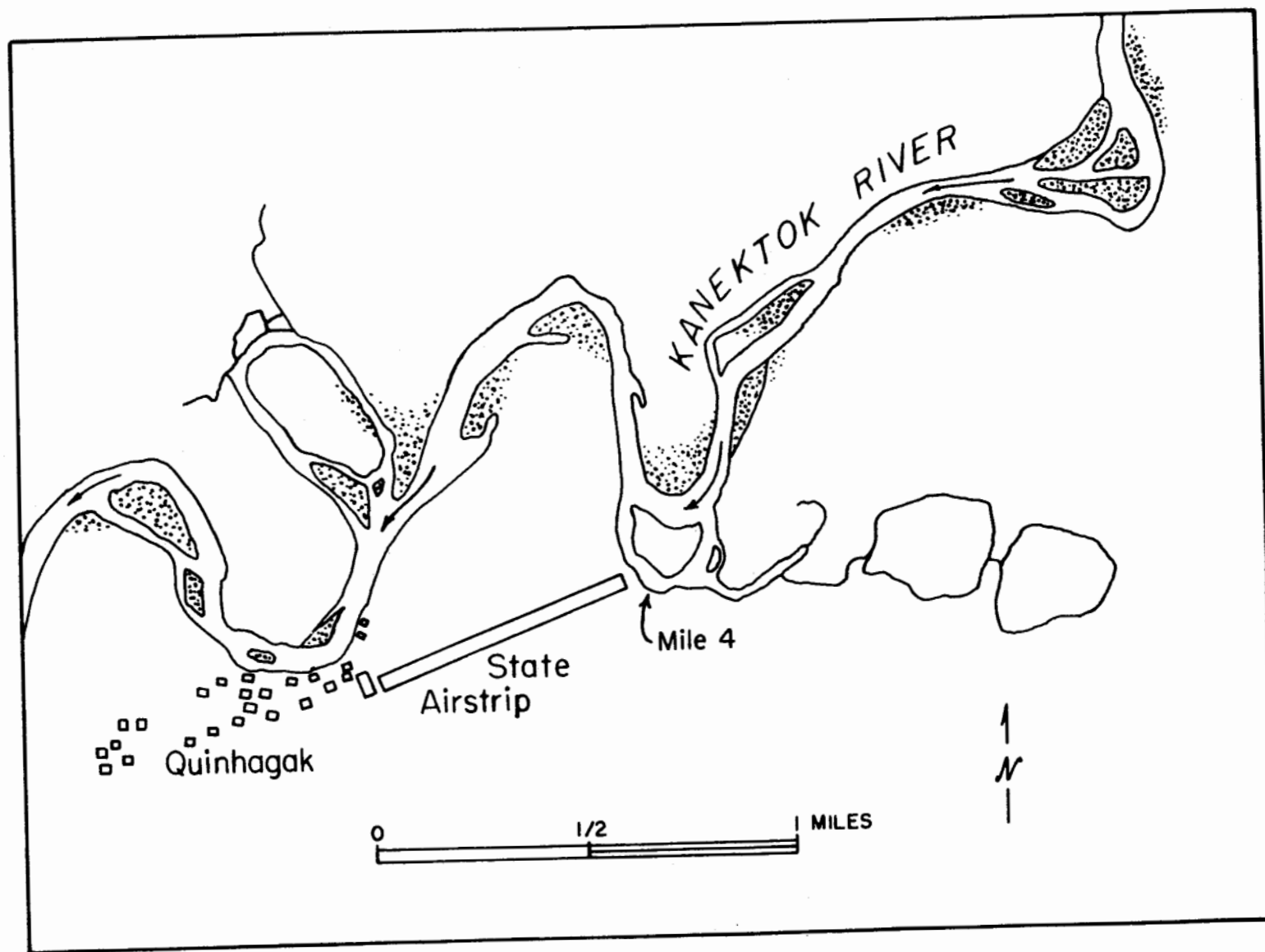


Figure 1. Kanektok River in vicinity of Quinhagak airport.

Six to seven guides operate on the Kanektok River, and all are involved in chinook salmon angling during early summer. Guides operate on the lower river during the peak of the salmon fishery using powered boats or float down into the chinook salmon fishing area using nonmotorized rafts. Nonguided anglers typically fly commercially into Quinhagak and fish near the airport landing field, or they are transported to a gravel bar on the lower river where they set up camp for 2-5 days.

In the early 1980s there were no fees associated with camping on Native-owned land; but in 1984 the Quaniqtuq Corporation began charging \$5.00 per day per person to camp on their land, which encompasses the entire lower river upstream to the Togiak Wildlife Refuge boundary (River Mile 28). This daily fee was increased to \$25.00 in 1985. Additionally in 1985, all guides but one were excluded from camping on the corporation's land.

Concurrent with the increase in fishing pressure for chinook salmon during 1982-1984, concern was voiced by anglers, local residents, and state and federal agencies that the chinook salmon resource was being overharvested by recreational fishermen. The daily bag and possession limits for chinook salmon during the 1984 season were 15 and 30 salmon, respectively; at their November 1984 meeting, the Alaska Board of Fisheries lowered these limits to five chinook salmon, respectively.

The Kanektok River chinook salmon run sustains an important local commercial fishery, and during the past 3 years, catches have ranged from 30,000 to 40,000 fish. Subsistence harvests in the lower Kanektok River have averaged about 3,000 fish annually, and escapements have ranged from 30,000 to 40,000 fish the past 2 years (Kim Francisco, ADF&G, pers. comm.).

In setting up the 1985 creel census, information gathered from Division of Commercial Fisheries and Division of Sport Fish personnel, and guides was used to determine the duration of the census. Historically, the peak of the chinook salmon run into the Kanektok has occurred between 18 and 25 June, but the peak number of fishermen has always occurred one week later; i.e., the last weekend of June and the 4th of July weekend. The 1985 creel census was designed to cover both of these peaks. The study was a cooperative venture: Joni Schelgrow (Division of Commercial Fisheries) assisted in data collection, and Rolland Holmes and Bob Clark, Sport Fish Division, provided assistance in statistical treatment of data.

Table 1 lists the common and scientific names of species of the study area.

## RECOMMENDATIONS

### Research

1. Continue the voluntary creel census in cooperation with the U.S. Fish and Wildlife Service.

Table 1. List of common names, scientific names, and abbreviations of fish found in the study area.

Common Name	Scientific Name and Author	Abbreviation
Arctic grayling	<i>Thymallus arcticus</i> (Pallas)	GR
Chinook salmon	<i>Oncorhynchus tshawytscha</i> (Walbaum)	KS
Chum salmon	<i>Oncorhynchus keta</i> (Walbaum)	CS
Coho salmon	<i>Oncorhynchus kisutch</i> (Walbaum)	SS
Dolly Varden char	<i>Salvelinus malma</i> (Walbaum)	DV
Pink salmon	<i>Oncorhynchus gorbuscha</i> (Walbaum)	PS
Rainbow trout	<i>Salmo gairdneri</i> Richardson	RT
Sockeye salmon	<i>Oncorhynchus nerka</i> (Walbaum)	RS

2. Conduct a complete creel census of Kanektok River from 24 June to 30 August 1986.

#### Management

1. Monitor the chinook salmon sport harvest during the peak of sport fishing pressure.
2. Provide information to the public concerning sport fishing on the Kanektok River.

#### OBJECTIVES

1. To estimate angler effort and sport harvest of chinook salmon on the Kanektok River from 22 June to 14 July (90% CI and approx.  $\pm 20\%$  of  $\bar{x}$ ).
2. To estimate sport harvest of incidental species (chum, pink, and sockeye salmon, and Dolly Varden and rainbow trout) in the Kanektok River from 22 June to 14 July (90% CI and approx.  $\pm 20\%$  of  $\bar{x}$ ).

#### TECHNIQUES USED

A stratified, random creel census was conducted to estimate harvest and effort on the Kanektok River between 15 June and 14 July. Major emphasis was on the chinook salmon harvest in the lower 10 miles (16 km) of the river. Additional chinook salmon harvest data from parties floating the river after 14 July were obtained from a voluntary postal creel census form. This postal creel census program was conducted jointly by Sport Fish Division and U.S. Fish and Wildlife Service, Togiak Refuge.

The Kanektok River chinook salmon creel census was divided into three strata: (1) Early season, 15-21 June; (2) Peak season, 29 June-7 July; and (3) Mid and late season, 22-28 June and 8-14 July.

During the early (#1) and mid- and late-season (#3) strata, the Commercial Fisheries Division staff randomly sampled (2-hour periods) the lower Kanektok fishery twice per day between 0800 and 2000 hours. The census in strata #1 and #3 (8-14 July) was conducted during 6 of 10 weekdays (60%) and 4 of 4 (100%) weekend days. This provided a coverage of 18% of the weekday fishing periods and 30% of the weekend days. Additionally, two late-night (2000-2200 h) and two early-morning (0600-0800 h) census periods were selected. These census periods were randomly employed during the entire strata #1 and #3 fishery (weekends and weekdays); only days already censused were eligible. Additionally, a census format for the week of 15-21 June was set up to be conducted if the chinook salmon run was early. The same scheme that was applied to stratum #1 was followed.

The census during the peak-season stratum (#2) was conducted on 3 of 4 weekdays (75%) and 5 of 5 holiday and weekend days (100%). This provided a coverage of 22.5% for weekdays and 30% for weekends and holidays. Additionally, two census periods were chosen after 2000 h, and two periods from 0600-0800 h. These four 2-hour census periods occurred either on a weekday or weekend day and sampled 22% of the early and late-fishery periods in strata #2 (0600-0800 h and 2000-2200 h).

Angler counts were made randomly on either the upstream or downstream leg of the trip. Angler interviews were conducted on the alternate leg of the trip. Catch statistics were kept separately for each angler.

At the beginning of a selected 2-hour census period, a coin was tossed to determine if angler counts or fisherman interviews were to be made first. Because of costs and logistical restraints, it was necessary to conduct interviews either immediately before or after angler counts. The census area included the river from its mouth to 1 mi (0.6 km) above the Commercial Fisheries Division sonar site.

Since most anglers fish 8 hours per day for 3 to 6 consecutive days on the Kanektok, it was possible to obtain complete angler interviews by contacting the same anglers the following day. In addition to anglers contacted during the regular census periods in strata #1 and #2, additional time was spent during stratum #2 interviewing anglers. These interviews took place during 2-hour blocks of time and were set up randomly. Also, fishermen from which only a partial census was obtained the previous day were asked for their total catch. Most completed fishing days were after 1700 h. Efforts were made to interview both shore-based and boat anglers.

All interviews for catch per unit of effort (CPUE) were conducted for individual anglers, as opposed to party interviews.

#### Data Analysis

The mean number of anglers per strata for each period of the fishing season is calculated by:

$$\bar{X} = \frac{1}{N} \sum_{i=1}^L N_i \bar{x}_i$$

Where:

$\bar{X}$  = the mean number of anglers per count for a category

$\bar{x}_i$  = the mean number of anglers per count for stratum i

N = the total number of hours in the category

$N_i$  = the total number of hours in stratum i

L = the total number of strata

The sampling variance of the mean number of anglers per count is as follows:

$$V(\bar{X}) = (1/N^2) \sum_{i=1}^L N_i^2 [(N_i - n_i)/N_i] [s_i^2/n_i]$$

Where:

$N$ ,  $N_i$ , and  $L$  are defined as above and,

$n_i$  = the total number of hours sampled from stratum  $i$ ,

$s_i^2$  = the sample variance for stratum  $i$

The total number of angler hours ( $X_T$ ) category is estimated by the following formula:

$$X_T = N\bar{X} = \sum_{i=1}^L N_i \bar{x}_i.$$

The variance for the estimate of total angler hours is:

$$V(X_T) = N^2 V(\bar{X})$$

The total number of angler hours during a stratum is estimated by summing of the estimates of total angler hours for weekdays and weekends/holidays. Because these are independent estimates, the estimated variance is the sum of the variances. The total fishing effort for the season and its variance is the sum of the variance estimates.

The mean catch per angler hour is estimated for each stratum as the mean CPUE for all individual angler interviews in a stratum. The number of fish caught in each stratum is the product of the strata estimates of mean CPUE and the total angler hours expended. The variance of this product is calculated as suggested by Goodman (1960):

$$V(X*C) = X^2*V(C) + C^2*V(X) - V(X)*V(C)$$

Where:

$V(X)$  = the variance of estimated total angler hours ( $X$ )

$V(C)$  = the variance of the estimated mean CPUE ( $C$ )

The total catch for each species is estimated for weekdays and weekends/holidays and then summed to estimate the total catch. These are independent estimates; therefore, the estimated variance of the total is the sum of the variances.



Creel-census information was initially written on "Rite in the Rain" forms. The creel census accounted all people actively fishing, including Quinhagak residents. A note was made regarding the age of these fishermen, as some were under 16 years of age and did not need a fishing license. Efforts were made to conduct angler interviews with these local fishermen; they generally fished fewer man-hours per day than other fishermen, and their chinook salmon catch (at least in 1984) was quite low.

During the second stratum, creel-census personnel randomly counted fishermen twice per day between 0800 and 2000h on the lower river. Census activity was conducted in the same manner as strata #1 and #3. In addition, comments were solicited concerning rainbow trout availability, effects of new chinook salmon and rainbow trout bag limits, and payment of the \$25.00 fee for trespass rights on Native land.

## FINDINGS

### Angler Effort

During 15 June-14 July 1985, 5,212 angler hours were expended on the Kanektok River; most of these hours were directed at the capture of chinook salmon. The estimate of effort at the 90% confidence interval was  $5,212 \pm 871$  hours ( $CI \pm 16.7\%$ ). An examination of the effort during the season indicates that peak effort in 1985 was during the week of the 4th of July and the one following it (Table 2). This was mainly due to an increase in guided-fishing activity.

Angler counts during the 15 June-14 July ranged from 0 to 47, with a mean count throughout the period of 12.4 anglers. The mean hours fished per day were 6.89 for 360 anglers who had completed fishing. This high mean value reflects the intensity of effort, as guided anglers generally fish 8 hours per day; unguided, nonlocal anglers also fish long hours and usually stay on the river from 2 to 4 days. The estimate of angler days was 756.

Since the chinook salmon run continued through July in 1985, the angler effort by guided fishermen would have increased the total angler effort and harvest. An attempt was also made to determine if effort was expended outside the normal 12-hour fishing day. Random angler counts made before 0800 h and after 2000 h indicated very little fishing during this time; thus, these figures were not used in computing total effort.

### Harvest

The estimated catch of the four important species in the summer sport fishery on the lower Kanektok River was 5,847 fish; of these, 1,058 (18.1%) were killed and 4,789 (81.9%) were released. The fishery during the early summer in the area covered by the creel census targets on chinook salmon, and during the 1985 census, 3,132 chinook salmon were caught (54% of total harvest) and 667 were killed (63% of total kill) (Table 2). The rainbow trout catch shown in Table 2 includes fish that

Table 2. Harvest of four species of important recreational fish, Kanektok River 15 June-14 July 1985. Estimates are ( $\pm 10\%$ ) at 90% CI.

Species *	Total Catch	Number Killed
KS	3,132 $\pm$ 342	667 $\pm$ 142
CS	2,121 $\pm$ 524	323 $\pm$ 216
RT	302 $\pm$ 71	26 $\pm$ 15
DV	292 $\pm$ 77	42 $\pm$ 16

\* KS = chinook salmon  
 CS = chum salmon  
 RT = rainbow trout  
 DV = Dolly Varden char

were taken by guided anglers upstream of the upper creel-census boundary who spent a major portion of the day fishing for chinook salmon. This is true, to a lesser extent, for Dolly Varden char.

Returns of 17 of 300 voluntary census forms indicated that July and August anglers floating the Kanektok River harvested seven additional chinook salmon but released them all (Table 3). An examination of CPUE during the season indicates that once chinook salmon became available, anglers enjoyed a high catch rate (Table 4). The catch/h of 0.6 chinook salmon from the Kanektok River is higher than the catch rate for chinook salmon from all other Alaskan waters (Mike Mills, ADF&G, pers. comm.).

The 1985 chinook harvest was less than 50% of the 1983 harvest; it was also less than the 1984 harvest (Mills 1984 and 1985). The lower 1985 harvest was because of less effort, the \$25.00 fee, and the bad weather. The river was in flood stage during two weeks of the census. The lowered limit probably had only a small effect on harvest, as only one angler expressed a desire to kill more than five chinook salmon.

Additionally, two sockeye (red) and six pink (humpback) salmon were harvested during the census period. Catch estimates were not determined for these minor species.

#### Characteristics of The Recreational Fishery

The Kanektok River recreational chinook fishery was pioneered by Bethel and Anchorage residents who flew to Quinhagak on commercial aircraft and either walked or boated to gravel bars on the lower river. When I first monitored the recreational fishery in 1973, the chinook fishery was in its infancy. Following the airport expansion in 1978, the end of the runway abutted a channel of the Kanektok River, so anglers could step off the plane and begin fishing for chinook salmon (Figure 1). By the time guides began operating in earnest in the early 1980s, the Kanektok River had been incorporated into the Togiak National Wildlife Refuge, and the spectacular chinook fishery became known to many Americans. In 1984 during harvest monitoring studies on the Kanektok River, seven guides were operating in the lower river; in 1985 only five guides were operating. Because of an extremely late spring, most guides cancelled bookings for the first 2 weeks of the season. Anglers from Anchorage and Bethel, while not as numerous as in 1984, continue to be an important component of the recreational fishery. Their numbers in 1985 were down because of (a) extremely high water, (b) inclement weather during the fishery, and (c) a charge of \$25.00/day per person for trespassing on private land that provided the best access to chinook salmon fishing.

Although angling in 1985 began on 15 June, the first chinook salmon were not caught until 19 June. Anglers would have enjoyed higher success rates if the river had not been flooding during the peak of the fishery.

Table 3. Number of fish harvested by floaters responding to voluntary creel census Kanektok River, 1985. Seventeen of 300 forms were returned.

Species <sup>*</sup>	Retained	Released
KS	0	13
CS	0	7
SS	3	458
RS	2	5
DV	4	566
RT	0	319
GR	2	168
LT	0	0

\* KS = chinook (king salmon)  
 CS = chum salmon  
 SS = coho (silver) salmon  
 RS = sockeye (red) salmon  
 DV = Dolly Varden char  
 RT = rainbow trout  
 GR = grayling  
 LT = lake trout

Table 4. Catch per hour for three strata of the Kanektok River creel census, 1985.  
Calculations are for fish killed (Kil) and released (Rel).

Date	Species <sup>*</sup>							
	KS Kil	KS Rel	CS Kil	CS Rel	RT Kil	RT Rel	DV Kil	DV Rel
15-21 June	0.046	0.057	0.000	0.000	0.000	0.000	0.000	0.000
22-29 June								
8-14 July	0.166	0.464	0.097	0.476	0.012	0.081	0.011	0.061
29 June- 7 July	0.147	0.582	0.080	0.364	0.026	0.072	0.032	0.074
Catch rate for Season	0.128	0.473	0.062	0.345	0.005	0.053	0.008	0.048

\* KS = chinook salmon  
CS = chum salmon  
RT = rainbow trout  
DV = Dolly Varden char

Guided anglers stayed in semipermanent camps, while nonguided anglers set up temporary camps at suitable gravel bars in the lower 8 mi of the river. Guided anglers stayed on the river from 4 to 7 days and typically fished 8 hours per day, while nonguided anglers stayed from 2 to 5 days and fished 7 to 10 hours per day. Local residents fished by boat for only short periods of time. Most local residents fished primarily for coho and chum salmon, and char as their tackle is not suitable for chinook salmon. In 1985 most anglers were able to catch their legal limit of chinook salmon (five). However, most anglers, especially those guided, released nearly all of their catch, except for an occasional chinook salmon to eat or to take home. Anglers fishing for personal use most commonly wanted to keep four fish, because that was the amount that would conveniently fit in a "wet lock" box or a cooler chest. Chinook salmon were so abundant during 1985 that anglers usually kept only fish weighing over 18 pounds (7.2 kg), releasing smaller fish.

Of the 678 total anglers contacted during the 1985 creel census, 551 (81%) were from out-of-state, 96 (14%) were area residents from Bethel or Anchorage and 31 (5%) were from Quinhagak (Table 5). Of the out-of-state anglers, 86% were guided, but only 8% of the Bethel and Anchorage anglers were guided.

During the creel census period, almost all anglers interviewed were over 16 years of age. A few local anglers under 16 years of age were observed fishing, but more were seen angling outside the organized creel census area. The local Quinhagak anglers formed an insignificant part of the Kanektok River chinook salmon recreational fishery, as they fished less than 2% of the time and caught fewer than 1% of the chinook salmon.

#### Chinook Salmon

The opportunity to catch a large number of chinook salmon in a relatively uncrowded stream is the major reason for anglers coming to the Kanektok River. Users include both catch-and-release anglers and those who wish to retain their catch. In 1985 chinook salmon were more available to anglers in late June and early July than in 1984, resulting in a higher release rate in 1985. Chinook salmon are taken both by boat anglers and shore anglers using medium-to-heavy spin and bait-casting gear and, to a lesser extent, fly gear. Spin-casting fishermen in 1985 utilized mainly lures (Mepps Spinners, Pixies, Daredevils, and Hot Rods), while about 20% of them used eggs; both types were very effective. Phosphorescent lures worked better in 1985 because of the extreme water turbidity during flood stage. In 1984, a year of below-average water levels, chinook salmon were captured mainly in areas of swifter water currents and often close to the bottom. Back trolling was employed successfully by many guides. In 1985 water levels were at flood stage and often salmon were found in sloughs and closer to the surface of the water column. Catch rate was influenced by angler tackle and skill as well as by salmon abundance. The salmon migrated upstream in small 'surges' or runs, and anglers with fly gear or light spinning gear often spent up to an hour fighting and landing a large-sized salmon. Anglers in 1985 retained only the larger-sized chinook salmon

Table 5. Residence of angler, Kanektok River 1985.

	Quinhagak	Bethel or Anchorage	Out of State
15-21 June	2	8 <sup>a</sup>	97 <sup>b</sup>
22-28 June and 8-15 July	10	34 <sup>c</sup>	241 <sup>d</sup>
29 June-7 July	<u>19</u>	<u>54<sup>e</sup></u>	<u>213<sup>f</sup></u>
TOTALS	31	96	551

a. Includes 2 guided; all anglers from Anchorage

b. Includes 20 nonguided

c. Includes 22 from Bethel

d. Includes 30 nonguided

e. Includes 24 anglers from Bethel; 6 Anchorage anglers were guided

f. Includes 28 nonguided

and in most cases released chinook salmon under 18 lb in weight. The average weight and length of a sample of angler-killed chinook salmon, including 10 females and 11 males, were 27.6 lb and 34.3 inches, respectively. The age composition of this catch was 5% age 4<sub>2</sub>, 90% age 6<sub>2</sub>, and 5% age 7<sub>2</sub>. The largest fish reported weighed 67 lb, and fish weighing from 25 to 35 lb were numerous. Fish taken in the lower-river fishery were silvery to light red in skin color, were excellent fighters, and were highly valued by all anglers.

In 1984 the majority of effort was expended in the lower 5 mi (8 km) of the river, but in 1985 most effort was concentrated from river mi 2 to river mi 8; very little effort was expended at the mouth of the river. Some chinook salmon fishing occurs in the middle and upper Kanektok on the spawning grounds, but nearly all these fish are released, as they are perceived to be in poor condition.

#### Chum Salmon

Chum salmon are taken incidentally to chinook salmon in the lower Kanektok River. The two exceptions are that local residents target on chum salmon because of their smaller size and guides with fly-fishing clients spend a considerable part of their fishing day in pursuit of chum salmon. In 1985 the first chum salmon was taken on 26 June, but large numbers were not available until early July.

In general, most chum salmon that were retained by anglers were eaten at camp. Chum salmon were found in shallower water and quieter sloughs than chinook salmon.

The chum salmon taken by recreational fishermen, especially in the early part of the run, are quite silvery in color and well accepted by anglers.

#### Rainbow Trout

Rainbow trout are taken incidentally to salmon in the lower Kanektok River creel-census area. In the middle and upper Kanektok River, the rainbow trout is the most sought-after species. While rainbow trout may be quite abundant in the lower river during winter, they are present only in limited numbers in the lower river during the chinook salmon fishing period.

The rainbow trout in the lower river have been reported by anglers and guides to be larger-sized than rainbow trout found in the prime habitat of the middle river. Five- to nine-pound fish were reportedly common; however, during my presence on the river in 1984 and 1985, I observed no fish of that size. Weight and fork length of fish retained by anglers were 2 to 5 lb and 462 to 580 mm, respectively.

Of the 302 rainbow trout reportedly caught (Table 2), 85% were caught by guided fishermen above the creel-census area. These anglers, however, spent the major portion of the day in the lower Kanektok River fishing for salmon. Of the 26 rainbow trout killed, most were taken in the creel-census area and generally by anglers seeking a 'trophy' for mounting.



Rainbow trout captured by chinook salmon fishermen were primarily captured using lures or eggs in habitat characterized by (1) deep cut-bank channels (sloughs or main river), (2) undercut grassy or willow-choked cut-banks, and (3) moderate to swift current. One fish was taken in the main channel of the Kanektok River in swift current.

#### Dolly Varden Char

Dolly Varden char are present in the Kanektok River in a number of life-history forms. In the creel-census area, anglers catch stream-resident and anadromous forms. Both forms probably overwinter in fresh water. The char caught during my research on the Kanektok (23 June-7 July) were all stream-resident fish weighing from 1 to 2 lb (0.4 to 0.9 kg). Generally, the anadromous forms migrate to salt water in late May and early June and begin entering fresh water by mid-July; thus, in 1985 most char caught were probably stream residents. On 2 July 1984 the first in-migrant anadromous char was captured at the mouth of the river.

In 1985 about half the Dolly Varden caught were taken by guided anglers in the section of the river above the creel-census area. Fish are caught using flies, spinners, spoons, and salmon eggs. Fish killed are generally quite thin, and most are consumed in camp.

#### Other Species

A few pink and sockeye salmon, northern pike, round whitefish, lake trout, and smelt are reportedly captured by recreational fishermen in the creel-census area in early summer. During the 1985 census, pink salmon were not abundant, and only a few were captured or killed. Sockeye salmon were not abundant and only one was caught. Smelt were abundant up to 30 June, and hundreds were snagged while fishing for salmon. No pike, lake trout, or round whitefish were captured by anglers during the 15 June to 14 July census.

#### Voluntary Creel Census Data

Over 300 voluntary creel-census forms were distributed to guided and unguided anglers floating the Kanektok River between June and September 1985. Only 17 forms were returned, but limited data indicate that these floaters are catch-and-release fishermen (Table 3).

The 17 respondents had fished 805 hours during 121 total fishing days. Table 3 indicates that, while coho salmon and rainbow trout are target species for the majority of anglers, the more abundant anadromous Dolly Varden has a higher catch rate than rainbow trout.

#### Comparison of 1985 creel census with Statewide Harvest Survey

Results of the 1985 Statewide Harvest Survey were not available as this study was prepared; however, several points can be made. The stratified creel-census program conducted on the Kanektok River during the chinook

salmon season is more statistically accurate than the Statewide Harvest Survey. The creel census estimate was  $667 \pm 142$  chinook salmon harvested. In 1985 this estimate was based on 359 completed angler interviews. By contrast, the 1983 Statewide Harvest Survey chinook salmon estimated harvest of 1,511 fish for the Kanektok River was based on only 15 completed angler interviews. Based upon past observations of the Kanektok fishery, as well as other fisheries in the Westward Management Area, I feel that the Statewide Harvest Survey generally overestimates the catch in remote areas where the respondent sample size is small. This is because (1) successful fishermen respond more often and (2) in spite of clearly stated directions, fishermen still confuse "fish caught" with "fish killed". For example, in 1984 two anglers had reported killing over 50 rainbow trout in 8 days of fishing, but upon closer investigation, it was found that all trout had been released.

#### Effects of \$25.00/day user fee on the chinook fishery

In 1984 the Quinhagak Village Corporation imposed a \$5.00 use fee on all fishermen (guided and unguided) for camping on or fishing from the corporation's land. This included the entire river from the mouth to approximately 20 mi upstream. Most fishermen were happy to pay the fee. In May 1985 the daily fee was raised to \$25 per person per day, and guides were prohibited from camping or fishing on the corporation's land. It is not known how many anglers cancelled their fishing trip to the Kanektok River because of the steep increase, but some Bethel- and Anchorage-based anglers mentioned that friends and members of their fishing parties had cancelled their trips. Also in 1985 no family groups with children were observed during the creel-census period. Some out-of-state and Anchorage anglers mentioned that they had finalized their fishing plans well before the 25 May notice of a \$25 daily fee appeared in the Anchorage and Bethel newspapers. Some of these anglers stated that they would not be returning to the Kanektok. Two guides who had operated on the lower Kanektok in 1984 did not operate in 1985. With this vacuum in the lower river, the one guide who had exclusive guide rights on the corporation's land had an increase in clients. Other guides fishing for chinook salmon camped above corporation land and used motor boats to reach the chinook salmon fishing area. There are rumors that the use fee will be increased to \$50/day in 1986.

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